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№ 15642

HIGH-RESOLUTION DEMS 01 THE **ALTYN TAGH** FAULT IN THE KUNLUN OF TIBET BY INTERFEROMETRIC PROCESSING OF SIR-C AND ERS-1 SAR" ."

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Interferometric processing of a suitable pair of SAR images can produce a high-resolution Digital Elevation Model (DEM). Repeated passes of the ERS-1 satellite SAR and the Shuttle Imaging Radar-C (SIR-C) provided interferometric image pairs over the west-central Kunlun 'mountains in northern Tibet, where the Altyn Tagh left-lateral strike-slip fault cuts through the valley of the Karakax River. The dry climate and lack of significant vegetation enhance the correlation of the image pairs despite long time intervals between some passes. While the steep (-23 degree) look angle of the ERS-1 SAR prevents the extraction of useful interferometric fringes in the high-relief areas due to layover, it contributes effective data in the flatter valley floor. The highest-resolution DEM possible with ERS-1 SAR has a gi id spacing of -20 m on the ground with a noise level and baseline length for this image pair cor responding to roughly 5-10 m of relative height error. The fault scarp associated with the active strand of the Altyn Tagh can be distinguished in many locations where it cuts through alluvial fans. The DEM-measured scarp height in those locations is about 10-15 m high.

The SIR-C SAR" collected data on orbits descending over the Kunlun on two successive days during October 1994. The higher bandwidth and more inclined look angle (~50 degrees) of the SIR-C data allow the derivation of an interferometric DEM over both the low-relief and high-relief areas with a grid spacing of -10 m on the ground. Both the L- (24 cm wavelength) and C-band (5.6 cm wavelength) image pairs from SIR-C were processed to a DEM. Because the relative height errors for a given level of phase noise depend on the ratio of the wavelength to the perpendicular baseline component, the noise level on the C-band DEM corresponds to 2-3 m of height error while the L-band DEM has 8-12 m relative errors. Correlation is much better at L-band, especially in the high-relief areas. Flood-plain margin erosional scarps that are -10 m high are easily identified on both the C and L-band DEMs. Hill-slope angles can be measured over -40x40 m windows from the interferometric DEMs.

* work performed under contract to NASA

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